REMARKS

Applicants appreciate the Examiner's thorough consideration provided the present application. Claims 1, 2, 4, 7-10 and 12-24 are now present in the application. Claim 1 has been amended. Claims 21-24 have been added. Claim 6 has been cancelled. Claims 1 and 9 are independent. Reconsideration of this application, as amended, is respectfully requested.

Claim Rejections Under 35 U.S.C. § 103

Claims 1, 2, 4, 6, 9, 10 and 12-20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over von Gutfeld et al., U.S. Patent No. 6,055,035 (hereinafter "Gutfeld"), in view of Paton et al., U.S. Patent No. 4,018,383 (hereinafter "Paton"). Claims 7 and 8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Gutfeld in view of Paton, and further in view of Masazami et al., U.S. Patent No. 6,331,884 (hereinafter "Masazami"). These rejections are respectfully traversed.

Complete discussions of the Examiner's rejections are set forth in the Office Action, and are not being repeated here.

In light of the foregoing amendments, Applicants respectfully submit that these rejections have been obviated and/or rendered moot. While not conceding to the Examiner's rejections, but merely to expedite prosecution, as the Examiner will note, independent claim 1 has been amended to incorporate the subject matter of claim 6.

Independent claim 1 now recites a combination of steps including "applying an on voltage to a resonator during emitting of the liquid crystal material to generate a vibration so as to apply a pressure to the projecting portion to emit the liquid crystal material from the projecting

portion, wherein the generated vibration is transmitted from the resonator to the projecting portion through a resonating plate."

Independent claim 9 recites a combination of elements including "a resonator for generating a vibration upon application of an on voltage to the resonator during emitting of the liquid crystal material" and "a resonating plate located between the resonator and the projecting portion for transmitting the vibration to the projecting portion so as to apply a pressure to the projecting portion to emit the liquid crystal material from the projecting portion."

Applicants respectfully submit that the combinations of steps and elements as set forth in independent claims 1 and 9 are not disclosed or suggested by the references relied on by the Examiner.

The Examiner referred to Gutfeld's apparatus 20 as the projection portion of claims 1 and 9. The Examiner has correctly acknowledged that Gutfeld fails to teach a resonator and a resonating plate as recited in the combination of claims 1 and 6 and in claim 9. However, the Examiner turned to rely on Paton's teachings and alleged that Paton's piezoelectric crystal 5/39 and impervious membrane 38 are the resonator and the resonating plate of the claimed invention, respectively. Applicants respectfully disagree.

In particular, Paton discloses that the impervious membrane is in contact with the liquid (see col. 7, lines 57-58). Therefore, when applying Paton's impervious membrane 38 to modify Gutfeld, *Paton's impervious membrane 38 will be inside Gutfeld's apparatus 20* (*i.e.,* inside the nozzle fixture 21) in order to be in contact with the liquid crystal material. However, Paton also discloses that *the piezoelectric crystal 5/39 is above impervious membrane 38 and the chamber 2*

(referred to by the Examiner as the projecting potion of claims 1 and 9) and is *in contact with the impervious membrane 38* in order to transfer the vibration to the liquid (see FIG. III).

In other words, since Paton's impervious membrane 38 will be inside Gutfeld's apparatus 20 in order to be in contact with the liquid crystal material, Gutfeld's nozzle fixture 21will separate Paton's piezoelectric crystal 5/39 from Paton's impervious membrane 38. This would destroy the function of Paton's impervious membrane 38 to transfer the vibration from the piezoelectric crystal 5/39 to the liquid. Without being in contact with the piezoelectric crystal 5/39, Paton's impervious membrane 38 would not be able to transfer the vibration 5/39 to the liquid. Therefore, one skilled in the art would not have the motivation to modify Gutfeld in view of Paton.

In the alternative, by placing Paton's impervious membrane 38 inside Gutfeld's nozzle fixture 21, the impervious membrane 38 would not be located between the piezoelectric crystal 5/39 (above the chamber/projecting portion) and Gutfeld's apparatus 20/nozzle fixture 21. Therefore, the combination of Gutfeld and Paton fails to teach "*a resonating plate located between the resonator and the projecting portion* for transmitting the vibration to the projecting portion" as recited in claim 9.

In still the alternative, since by placing Paton's impervious membrane 38 inside Gutfeld's nozzle fixture 21, the impervious membrane 38 would not be located between the piezoelectric crystal 5/39 (above the chamber/projecting portion) and Gutfeld's apparatus 20/nozzle fixture 21. Therefore, the vibration generated by Paton's piezoelectric crystal 5/39 will not be transferred to Gutfeld's apparatus 20/nozzle fixture 21 through Paton's impervious membrane 38, but to Paton's impervious membrane 38 through Gutfeld's apparatus 20/nozzle fixture 21. Therefore,

the combination of Gutfeld and Paton fails to teach "the generated *vibration is transmitted from the resonator to the projecting portion through a resonating plate*" as recited in claim 1 and "*a resonating plate* located between the resonator and the projecting portion *for transmitting the vibration to the projecting portion*" as recited in claim 9.

In still the alternative, the combination of Gutfeld and Paton fails to teach "applying an on voltage to a resonator during emitting of the liquid crystal material to generate a vibration so as to apply a pressure to the projecting portion to emit the liquid crystal material from the projecting portion" as recited in claim 1 and "a resonator for generating a vibration upon application of an on voltage to the resonator during emitting of the liquid crystal material" as recited in claim 9.

As the Examiner may know, an alternating on and off voltage will be applied to a piezoelectric crystal in order to generate vibration. If there is simply an on voltage applied to the piezoelectric crystal, the piezoelectric crystal will be deformed in a fixed shape. In other words, when the voltage remains on, the piezoelectric crystal *keeps the same deformed shape without generating any vibration*. Therefore, Paton fails to teach "applying an *on voltage* to a resonator during emitting of the liquid crystal material to generate a vibration" as recited in claim 1 and "a resonator for generating a vibration *upon application of an on voltage* to the resonator during emitting of the liquid crystal material" as recited in claim 9.

Unlike Paton's deformation of the piezoelectric crystal, in the present invention, an on voltage is applied to the resonator so that the *resonator generates a vibration during the emission of the liquid crystal material*. Because of the vibration of the resonator, a projecting pressure is

applied to the projection portion and the liquid crystal materials are emitted from the projection portion. This feature is clearly absent from Paton.

With regard to the Examiner's reliance on Masazami, this reference has only been relied on for its teachings related to some dependent claims. This reference also fails to disclose the above combinations of steps and elements as set forth in independent claims 1 and 9. Accordingly, this reference fails to cure the deficiencies of Gutfeld and Paton.

Accordingly, none of the references relied on by the Examiner individually or in combination teach or suggest the limitations of independent claims 1 and 9. Therefore, Applicants respectfully submit that independent claims 1 and 9 and their dependent claims (at least due to their dependency) clearly define over the teachings of the utilized references. Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 103 are respectfully requested.

Additional Claims

Additional claims 21-24 have been added for the Examiner's consideration. Support for new claims 21-24 can be found in FIG. 3 as originally filed.

Applicants respectfully submit that claims 21-24 are allowable due to their respective dependence on independent claims 1 and 9, as well as due to the additional recitations included in these claims.

Favorable consideration and allowance of additional claims 21-24 are respectfully requested.

CONCLUSION

All the stated grounds of rejection have been properly traversed and/or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently pending rejections and that they be withdrawn.

It is believed that a full and complete response has been made to the Office Action, and that as such, the Examiner is respectfully requested to send the application to Issue.

In the event there are any matters remaining in this application, the Examiner is invited to contact the undersigned at (703) 205-8000 in the Washington, D.C. area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Dated: December 19, 2006

Respectfully submitted,

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